2006-242: A PROTOCOL FOR EVALUATING WEB-BASED RESOURCES TO INTEREST GIRLS IN STEM CAREERS

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A Protocol for Evaluating Web-Based Resources to Interest Girls in STEM Careers

> *There is a quiet crisis building in the United States — a crisis that could jeopardize the nation's pre-eminence and well-being. The crisis has been mounting gradually, but inexorably over several decades. If permitted to continue unmitigated, it could reverse the global leadership Americans currently enjoy.*[1] (Jackson, 2004).

This excerpt is from the Building Engineering and Science Talent (BEST) initiative[2], a report issued in September 2001 by the Council on Competitiveness, a group of industrial, university, and labor leaders whose mission is elevating national competitiveness to the forefront of national consciousness. The Council on Competitiveness is a public-private partnership "to identify the most effective strategies for building a more diverse science, engineering, and technical workforce and to bring best practices to communities nationwide.[3] The report describes a shortfall of scientists, engineers, and other technically skilled workers.

Much research literature documents the under representation of women in science, technology, engineering, and math (STEM) disciplines, linking this problem to the attitudes and behaviors of girls from elementary school through graduate studies and employment. The studies reflect a clear gender distinction at all ages,[4,5] showing that as girls grow older, there is steady decline in the number expressing interest in STEM subjects, and a corresponding decline in the numbers of women entering higher levels of study. Numerous programs proposed, and implemented over the past decade to improve gender equity in STEM education and workforce. These programs seek to provide information and other support for women and girls, allowing them to make better informed decisions with respect to their educational activities and career planning.[6,7] Given the proliferation of such efforts, some measurable effect on "entry and persistence" of women into these professions should be expected. However, data do not indicate substantial gains.[4,8]

The possibility exists that the apparent failure of these programs is due to a failure to implement or adopt them broadly. Teachers may lack the time to locate and evaluate additional resources to address such gender equity issues, or may lack the budget to adopt commercially available resources. Even when appropriate materials are available for little or no cost, such as those on websites for many gender-equity programs, teachers may not understand how or when to use them.[9,10] Research suggests that only a small percentage of teachers believe it is appropriate to address gender-equity concerns in the typical classroom.[11] Those who do may not have support of the school administration to adopt programs perceived to benefit only girls.[12]

This paper seeks to identify a set of criteria for use by teachers in evaluating existing websites with the potential for increasing interest and persistence of middle school girls in STEM fields. The criteria identified are not intended to be understood as comprising a model of psychometric rigor. Rather, taken together, they offer a framework for evaluation based on the research literature, and can be modified and weighted according to classroom need. The evaluation protocol developed emphasizes selection of materials that might appeal to both boys and girls, allowing teachers to adopt them without concern that they are providing an unfair advantage to girls. The goal is to use the results to identify and recommend general purpose materials that

teachers are more likely to adopt and use in the classroom, but with some confidence that the materials will have the effect of encouraging young women in STEM career interests. The recommendations will be summarized as part of a website directing teachers to these resources, and providing a context for use as supplementary activities for career exploration in the classroom.

Review of the Literature

Early studies indicated that women avoided STEM disciplines because of difficulties in mathematics and science. Hence, girls entered college level studies without adequate preparation for STEM fields, and so avoided them. Programs designed to stimulate interest in mathematics and science,[13] to make them entertaining and appealing to girls, were offered to address this problem. Some recent research has indicated that skills development programs have been successful, and that girls are participating equally in middle and high school studies in science, mathematics, and technology, entering college studies without the skill gap observed in the early 1990's[4,14]. If this is true, other influences must be responsible for the continued gender gap in STEM college courses and employment.

Educational materials, books, and websites attempt to interest girls in STEM disciplines by providing "virtual" role models for girls through biographies of female scientists and engineers. There are websites devoted to increasing interest in, or raising awareness of, STEM careers as exciting and challenging, with the intention that young girls will then aspire to these in spite of the stereotypes. These resources highlight scientific and engineering specialties thought to appeal more strongly to females. Many such programs include a substantial website component. The BEST initiative[15] argues that while websites may have some beneficial effects, they would benefit more from increased *curricular integration* of science, technology, and math. To be effective, web-based materials must direct the target audience to the resources, or alternatively, exhibit a strong interest in the subject in order to seek them out.[16]

The Gender & Science Digital Library (GSDL) project has addressed the needs of teachers seeking to provide an "interactive collection of high-quality, gender-equitable science, technology, engineering and mathematics (STEM) resources for K-12, higher education (community college and university), women's studies, teacher preparation programs, and informal learning environments."[17] Materials accessed on the GSDL website have been reviewed for quality, providing the user with confidence in their use. The site serves as a clearinghouse for materials, providing a description referencing the basic content and aims of the material, appropriate age groups, and other relevant information.[18] However, the primary goal of the GDSL project is to make available this type of resource. The site does not clearly provide guidance as to how or when to access these resources, or in what context, except to the extent that the referenced materials do so.

The GSDL project also attempts to learn more specifics regarding what teachers are looking for in web-based resources, as part of their *Digital Libraries: Effective Access* project for STEM educators. A preliminary report available online[19] describes survey results showing that a significant number of the STEM educators surveyed (86%) had not received training in equity in STEM education. Further, one-half of the teachers surveyed had not received training and were not interested in such training (p. 38).

Teachers rely on some of their regular professional reading (educational journals or newsletters) or colleagues to reference good websites.[19] The GDSL study focused on "effective access," and participants were asked to "select the top three challenges faced in seeking and using Web-based resources" 71% responded that the time it takes to locate resources was the primary concern. When participants were asked, "How long do you typically spend looking for educational resources on the web?" Sucher (2003) reports slightly more than two-thirds replied with some amount up to ten hours per month.

Procedures

This project sought to understand how websites and electronic resources might retain the advantages of "informal" education, yet maintain the accessibility and structure afforded by the classroom. This was accomplished using the results of published research results, in order to leverage the past investments in research and scholarship, rather than establishing yet another survey or assessment. The AAUW[6] report summarized 416 projects in terms of subject content (science, technology, engineering, or math related, or some combined subject elements). Of the four "STEM subjects," science received the greatest attention, with 196 of the 416 programs citing science content as a primary subject matter. The lowest representation was for engineering programs, with only 64 programs claiming engineering as a focus. In addition, in spite of the funded programs' fundamental commitment to gender equity, a significant number of programs (approximately 40%) served both boys and girls.

The AAUW report further highlighted the characteristics of each subject emphasis. In this, technology focused programs were singled out for three unique characteristics. First, every technology-focused program specified at least some kind of goal for the program, while some programs in science, engineering, and mathematics omitted this. More than two-thirds of these had a goal to "increase student engagement with technology" and one-third including goals of career awareness or gender equity awareness. Second, one-third of these were school-based (which was the highest percentage of school-based programs of all the STEM subjects). Finally, in comparison to the other STEM subjects, technology projects seemingly provided a unique opportunity for interdisciplinary focus, with 71% combining technology activities with science, engineering, or mathematics content.

These findings indicate that "technology" as the focus of program subject matter provides a vehicle compatible with achievement of other learning goals. Further, 10 of the 17 web-based programs were in the subject area of technology. Thus, technology was selected as a subject focus uniquely suitable to the purpose of the project, to facilitate the use of existing web-based resources in the classroom setting. The term technology is of course subject to definition, and it is not clear than any two researchers use the term consistently. For purposes of this paper, technology was understood to refer principally to information or computer technology, although this might applied in a wide variety fields (including applications of technology in science or engineering, as well as more common applications in publishing, entertainment, and so forth.

The second stage of the project sought to identify appropriate websites or Internet tools for inclusion in a website for teachers. It was necessary to provide some criteria for evaluation of

the candidates in terms of the potential learning experience and ease of incorporation into the regular curriculum. A review and analysis of three previous studies on evaluation of gender-equitable software and programs, each focusing on a different aspect of "assessment issues" with respect to gender equity programs, was undertaken:

- Gender & Science Digital Library (GSDL)
- Building Engineering & Science Talent (BEST)
- Girls Tech (from The Douglass Project)

The Gender & Science Digital Library (GSDL) project addressed the needs of teachers seeking to provide an "interactive collection of high-quality, gender-equitable science, technology, engineering and mathematics (STEM) resources for K-12, higher education (community college and university), women's studies, teacher preparation programs, and informal learning environments."[17] Materials accessed on the GSDL website have been reviewed for quality, providing the user with confidence in their use. The site serves as a clearinghouse for materials, providing a description referencing the basic content and aims of the material, appropriate age groups, and other relevant information.[18] However, it does not clearly provide guidance as to how, when, or in what context to access these resources.

The website for the BEST initiative specifically notes its emphasis on programmatic results: "BEST sought to convene the nation's respected practitioners, researchers and policymakers and identify "what's working" across the country to develop the technical talent of under-represented groups in pre-K through 12, higher education, and the workplace."[2] The BEST program goal is to encourage adoption of programs that have extensive research studies supporting effectiveness. However, the end list of resources did not provide any that would be readily accessible to a teacher involved in preparing lesson plans.

The Girls Tech investigators created a framework for evaluating the appeal of websites, CD-ROMs, and other electronic information resources to young women. This framework, called "The GirlsTech Model," was developed by analyzing library and information science and gender studies research, and through original theoretical work. Consequently, resources selected using the GirlsTech Model can encourage young women to increase their use of websites and related technology, thereby increasing their computer experience and confidence and making computer and technology professions more appealing career options.[20] This template addresses how to interact with technology, and is more concerned with "attractiveness" and improving attitudes of girls toward the STEM subject by making the experience more enjoyable.

The budgetary constraints of most schools make it is necessary to focus on website resources that are free of charge, and yet provide high quality materials. Therefore, some of the government funded projects were considered as primary candidates for inclusion.[6,7] These sites will provide free or low cost materials, with associated government financial support to ensure continued access and maintenance.

Evaluation of CareerQuesting Resources

Given the purpose of this project, none of the three evaluation protocols reviewed proved to be appropriate. The GSDL tool is perhaps the most useful, but it is overly detailed to facilitate

curriculum development. The Girls Tech approach to "gender specific" criteria attempts to generalize "female" preferences in a categorical manner to enhance "enjoyment" or engagement but does not necessarily address the effectiveness of resources. In practice, the Girls Tech tool also failed to identify a substantial pool of resources that were more than "average" with respect to some of the key "female friendly" factors. Finally, the BEST template is the only one that strongly emphasizes programmatic effectiveness, and attempts to impose a strict definition of success (using rigorous investigative assessment of student outcomes). However, this approach fails to provide a sufficient pool of accessible (and affordable) materials, unlike the GSDL, for which one criterion of any resource selected for inclusion is that it be readily available via the Internet at no cost to users.

The literature review on gender-specific issues in career selection also identified four key elements that the resources or activities should emphasize: 1) Career Information and Exploration, offered at a point where the girls have not internalized a negative perception of STEM subjects; 2) Personal Identification and Relevance. Students may perceive they have no personal need to learn about technology. If they can find ways that technology benefits them directly in their daily lives, they are more motivated to learn and master the basic skills necessary to use it; 3) Real World Application and Context--allowing girls to acquire basic technical skills or a knowledge base to enhance their sense of competence in STEM-related activities; and 4) Social Interaction and Teamwork—STEM education should emphasize the working with others to solve problems and applying technology to further communication and social relations.

These should provide a foundation for students to exercise their talents and creativity in a scientific or technical outlet, and find the experience to be both enjoyable and rewarding. It is important to emphasize that each of these elements will also benefit all students, not just girls, providing an opportunity to encourage less technically inclined boys to develop these same competencies, and further broaden the pool of skilled workers in technology and related fields. Levine[21] argues that the classroom must focus more on work-life readiness, giving students the tools they need to be productive and effective in their careers (pp. 10-11).

The emphasis of the CareerQuesting resources is upon providing the students with the learning experiences that will engage them in the process of career exploration and selection. Unlike resources explicitly targeted to girls, teachers and administrators have a clear and compelling motivation to provide students with this kind of career preparation experience.

There were two broad resource categories, websites and WebQuests. WebQuests are web-based constructivist lesson formats that present a problem or series of tasks to be addressed by students using suggested web-based resources for research.[22]

The final section of the tool included a two-stage review, with a preliminary screen that focused on the key elements of accessibility and content suitable for general classroom use. Each of the resources identified was evaluated using the pre-screening questions. In particular, the websites should be easy to use without excessive adaptation of materials, available at no cost, and the materials should be appropriate for a diverse student population.

Four tables follow. A summary of the evaluation criteria appears in Table 1. Table 2 presents a template for evaluation of the CareerQuesting websites. Pre-screen scores have a high of 22,

with a preferred score of 15or above. An electronic resource that met the pre-screening criteria was evaluated further. The resource must have met at least “Average” standards with respect to the listed criteria, with preference given to with highest scores.

If a site passed the initial pre-screening, it was subjected to the final review process using the Website and WebQuest Scoring Sheet presented in Table 3. The final selection of recommended resources proceeded to identify the "top ten." The rankings of those Websites and WebQuests are shown in Table 4:

Table 1 Summary of CareerQuesting Evaluation Elements

General Content and Media Criteria Pre-screen

Domain: Contains subject matter in the domains of natural sciences, pure or applied, mathematics, engineering, or technology.

Grade level Middle school students, appropriate for classroom use.

Access/ Availability: Readily available, via the Internet, at no cost, with clear means of ongoing support and funding. Minimal use of advertising (may acknowledge corporate sponsors) Easy to use, clear directions and functionality, utilizes only content and tools available on the site or commonly available and accessible to the public.

Functionality Must meet minimum design and technical support criteria commonly expected of websites and multimedia, including good page layout and navigational design.

Final Evaluation elements

Gender Equity Criteria *

1. Consistent with general principles of gender equity/inclusivity
2. No specific programmatic goals for STEM diversity

Gender-Specific Criteria for Media and Software *

1. Career Information
2. "Real world" application/ Contextuality
3. Relevance/ Personal Identification-
4. Social Connectivity/ Collaboration

Pedagogical Criteria

1. Technology use
2. Standards and credibility
3. Versatile Use
4. Flexibility
5. Interdisciplinary

* If practical, the materials can be integrated with other resources or adapted to compensate for a lower score in these areas.

Table 2 Template for Evaluation of CareerQuesting Websites

General Content and Media Criteria Pre-screen

Domain: Natural sciences, pure or applied, mathematics, engineering, or technology.
1. Yes (+5) 2. No (-5)

Grade level: Middle school students, appropriate for classroom use.
1. Yes (+5) 2. No (-5)

Access/ Availability: Readily available via the Internet at no cost; clear means of ongoing support and funding. Minimal use of advertising. Easy to use, clear directions and functionality, utilizes only content and tools available on the site or commonly available and accessible to the public.
1. Yes (+5) 2. No (-5)

Functionality: Meets minimum design and technical support criteria commonly expected of websites and multimedia, including good page layout and navigational design.

Ranking	Weighted Score
1= 1st quartile (site ranks in top quartile)	5
2= 2nd quartile	0
3= 3rd quartile	-2
4= 4th quartile ranking (site ranks in lowest quartile)	-5

Websites or other Internet materials to be considered for inclusion in the "Career Questing" resource guide will be evaluated according to the following criteria. Each site will be rated with respect to the factors listed as follows:

Score	Evaluation Guidelines
"Poor"	Contains no aspects of desired criteria, or inadequate in functionality or content.
"Below Average"	Materials have few desired elements or factors listed. Materials considered for inclusion only if there is necessary functionality or content not available otherwise.
"Average"	Site consistent with similar resources. For gender-specific criteria, preference given to resources that can be directly adopted with minimal modification
"Above Average"	The resource or website conforms in most respects to the desired criteria, or does provide a sound foundation for adaptation to meeting the criteria.
"Excellent"	Materials are exemplary with respect to the desired criteria, and are acknowledged as such by experts and/or educators.

Score Ranking: Each of the relative scores was assigned a weighting value as follows:

Score	Weight
Excellent	+5
Above Average	+3
Average	0
Below Average	-3
Poor	-5

Score Range	High	Low
Gender Equity Criteria	10	-10
Gender Specific Criteria	20	-20
Pedagogical Criteria	20	-20

Table 3 Website and WebQuest Scoring Sheet

Resource: _____ **URL**: _____

Criteria	Description	SCORE
Gender Equity Criteria		
Gender equity/ Inclusivity	Content and activities suitable for both boys and girls. Resources should portray balanced images and content with respect to the participation of men and women, boys and girls in related activities, and be inclusive of other "underrepresented" groups.	
Programmatic goals for STEM diversity	No strict requirement for explicit gender equity focus, but the materials or websites should conform to best practices for engagement of student interest and building enthusiasm for understanding and application of STEM skills.	
Gender-Specific Criteria for Media and Software		
Career Information and/or "Real world" application	Content linked to inspirational content on related careers, specific career exploration component that addresses issues relevant to student interests, or which highlights the real-world applications of the technology or subject matter.	
Relevance/ Personal Identification	Website should provide students with a chance to experiment and apply technology in ways that relate to their own interests or allow them to leverage additional talents and interests.	
Social Connectivity/ Collaboration	Will provide elements allowing for collaborative interactions between students, or can be integrated with other sources add opportunities for students working together.	
Contextuality	Content is provided along with background or history, supplemental information on application is provided. If this is not provided, within the site or resource, can the material be integrated with other content to frame and present the activity or experience?	
Pedagogical Criteria		
Technology use	Interactive content, increases student engagement with technology, development of fundamental technology use skills.	
Standards and credibility	Content will meet highest standards of scientific and technical creditability, and will be endorsed/ produced by a reputable source.	
Versatile Use	Materials or tools allow for customization of the activity or applications Can be adapted or customized for use in different class setting or curriculum content.	
Flexibility	Preferences will be given to sites that provide a general purpose experience, where skills can be applied in a variety of other contexts, including general application of technology to problem solving, etc. Provide opportunity for students to exercise basic skills and processes creatively.	
Interdisciplinary	Preference will be given to technology related activities that integrate other STEM related content, including mathematics, physical sciences, and engineering	

Table 4 Website and WebQuest Rankings

Websites	Pre-screen Ranking	Gender Equity Criteria	Gender specific Media Criteria	Pedagogical Criteria	Overall
Kidz Online	1.00	1.00	0.90	1.00	0.97
USA Today Education--Career Quest	0.91	0.80	0.55	0.60	0.71
Career Voyages	0.91	0.80	0.45	0.60	0.68
Project Cybercareers	0.77	0.60	0.65	0.80	0.72
Ohio Math Works	1.00	0.80	0.90	1.00	0.94
GM--GMability	1. 00	0.80	0.65	0.80	0.82
NASA Quest[23]	1.00	0.80	0.80	0.75	0.85
Invention at Play	1.00	1.00	0.70	1.00	0.92
GetTech.org	1.00	0.80	0.55	1.00	0.85
eCybermission	1.00	1.00	0.65	0.90	0.88
WebQuests					
Who am I? Career Webquest	0.45	0.80	0.65	0.70	0.63
Martin William's Career Webquest	0.55	0.30	0.30	0.45	0.42
Futurequest	0.55	0.80	0.45	0.45	0.53
CyberScience Magazine	0.77	0.60	0.55	0.55	0.63
NetForce Webquest	0.77	0.50	0.75	0.09	0.76
Dr. B's Atlantis Quest	0.55	1.00	0.75	1.00	0.79

Best Overall Website

Kidz Online - Tech Training http://www.kidzonline.org/TechTraining/ best met the criteria specified. It includes extensive technical education resources on subjects ranging from animation to webpage creation. There are lesson plans for nearly every subject from English and Language Arts to Science and Technology Education. The materials are intended for students from 6th to 12th grade. Technology skills are highlighted in nearly every area.

Best Career Planning Websites

Three websites were chosen to provide alternatives for career exploration tools (these websites are explicitly devoted to career exploration or planning activities).

USA TODAY Education Career Quest http://www.usatoday.com/educate/careers/careers.htm

A general career exploration resource

Career Voyages – Welcome http://www.usatoday.com/educate/careertech/index.html Contains valuable content, but may be more suitable for slightly older students.

Projects CyberCareers Home http://www.nwcet.org/projects/cybercareers/default.asp
A general career exploration resource

Best Technical Sites

Three websites were chosen as the best sources of in-class technical assignments to foster interest in STEM subject matter. These websites are primarily considered as resources for technical assignments and application of technology, building of technical skills, but in some cases included elements of career exploration as well.

Ohio Math Works http://www.ohiomathworks.org/ A high-quality resource focusing on development of quantitative skills and real-world application of mathematics, with elements of career exploration.

GM - GMability Education 5-8 http://www.ohiomathworks.org/ Emphasizes technical subjects and engineering related careers.

Welcome to NASA Quest! http://quest.arc.nasa.gov/index.html Significant classroom and educational resource support.

Best General Education Resources

Three websites were chosen as general-purpose websites for teachers to find lesson plans or ideas for class assignments. These sites have interactive content or game-like activities for students. Resources focus on more involved, longer-term activities.

Lemelson Center presents Invention at Play http://inventionatplay.org/ Focuses on creativity and having fun with technology and basic science or engineering skills.

GetTech.org (also Getsmarter.org Home) http://www.getsmarter.org/index.cfm Provide online game-like activities, along with tutorial or quiz-applications

Welcome to eCYBERMISSION http://www.ecybermission.com/index.cfm A resource for a

team-competition activity with more than average involvement and lesson plan development. Other competitions often focus on "math drills" or robot building, or similar activities that are either more like trivia contests or are somewhat remote from daily life. Projects focus on "working to solve problems in your community." Also, the competition is directed toward for teams of 6th to 9th grade students, making it more likely that students will find the projects more interesting and relevant.

WebQuests were the subject of a separate search and evaluation process, to find specific examples that embody key elements of the CareerQuesting functionality. Since these are designed by teachers for their own use, they provide a very flexible resource for classroom use.

Best for Career Exploration

Each of the following is a well-developed career exploration activity. The FutureQuest activity includes a group task to allow for student collaboration on the project. There are links to several good interactive resources for career interest testing and assessment as well:

Who Am I? Career WebQuest http://home.sullivan.k12.il.us/teachers/lawson/webcareers.htm

Martin Willams's Career WebQuest
http://home.sullivan.k12.il.us/teachers/lawson/webcareers.htm

FutureQuest http://www.pvpusd.k12.ca.us/teachweb/twidwelll/FutureQuest.html

Best for Technical Skills

Each of the following WebQuests focuses on assignments to learn webpage construction skills or use of the Internet for research.

Cyber Science Mag http://projects.edtech.sandi.net/kearny/cybermag/index.html Suitable for use in general English/Composition courses and Journalism, or as part of science and technical education classes.

NetForce http://www.geocities.com/lukasaurus_smith/ Group assignment structure makes this useful for teamwork and collaboration activities.

Dr. B's Internet Research Guide: Atlantis Quest
http://drb.lifestreamcenter.net/Lessons/Atlantis/index.htm Group assignment structure makes this useful for teamwork and collaboration activities.

Recommendations and Conclusions

This paper sought to identify criteria for use by teachers in evaluating web-based resources with potential for increasing interest and persistence of middle school girls in STEM fields. In particular, the tool was used to identify general-purpose materials that might appeal to both boys and girls, allowing teachers to adopt them without concerns that they are providing an unfair advantage to girls.

Resource selection should be validated using an independent review process to establish quality standards for all resources. It may be necessary to make some modification of the tool, since in finalizing the list of websites for inclusion as recommended resources, it was apparent that the

final selection process remained difficult. This was especially true in the decisions as to whether or not a particular website met the requirement that a resource be from a reputable source with evident means of funding or support. It is possible to argue that some of the resources selected as recommended resources did not fully meet this standard.

This was particularly the case with government and non-profit sources. Generally, both met the reputation requirement but the funding element was difficult to evaluate. Most of the non-profits, such as universities, were dependent on money from federal grants. Some of the resources selected were part of government initiated educational reform, and thus were subject to policy changes that would eliminate a particular program or website. For corporate resources, funding was not seen as an issue, but corporate outreach and community involvement policies could shift dramatically, and a particular website might be eliminated.

It is important that the CareerQuesting resources be established as effective in encouraging students to identify and seriously consider challenging, rewarding, and enjoyable career opportunities in technical fields. To that end, the outcomes of using each of the selected resources in the classroom should be systematically evaluated. The goal is to prepare students for what Levine[21] terms "work-life readiness:"

> *A sizable hunk of a child's success is measured by her ability to comply, to learn what she is expected to learn, and to do what she's told to do. An adult must be able to chart her own road maps. The odyssey leading into adulthood can be a lonely and harsh voyage, especially if a startup adult is naive and uninformed, if he's never learned to be a mapmaker.* (p.10)

The intent of the CareerQuesting model is that boys and girls will be taught to be “mapmakers” as part of the regular curriculum. A quest usually refers to a long journey of discovery and learning, with a person seeking an important goal or treasure at the end. Students need a map for this inevitable “career” quest each must embark upon. They need to know how to make such a map, and how to use the map. The goal of evaluating websites is to provide teachers with better access to some of the best tools and resources to help create a generation of mapmakers that will be comprised of both boys and girls.

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